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The Sigma Conjecture for Solvable S-Arithmetic Groups and Morse Theory on Euclidean Buildings

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ABSTRACT. Given a finitely generated group G, the Sigma invariants of G consist of geometrically defined subsets $\Sigma^k(G)$ of the set $S(G)$ of all characters $\chi\colon G \to R$ of G. These invariants where introduced independently by Bieri-Strebel and Neumann for $k = 1$ and generalized by Bieri-Renz to the general case in the late 80's in order to determine the finiteness properties of all subgroups H of G that contain the commutator subgroup $[G, G]$. In this talk we determine the Sigma invariants of certain S-arithmetic subgroups of Borel groups in Chevalley groups. In particular we will determine the finiteness properties of every subgroup G of the group of upper triangular matrices $B_n(Z[1/p]) < SL_n(Z[1/p])$ that contains the group $U_n(Z[1/p])$ of unipotent matrices where p is any sufficiently large prime number.